Name: _____ TP: _____

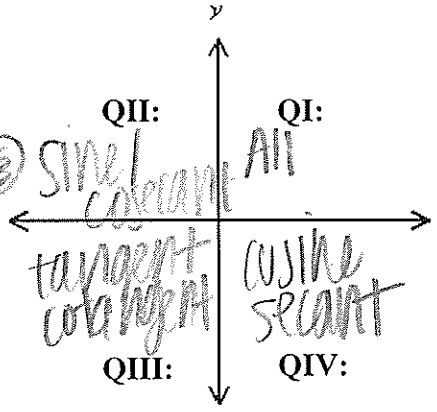
Trigonometry ***SWAG*** Sheet
Honors Geometry

"Swag is **earned** not given!"
(Make sure you can prove every fact on this sheet)

S.W.A.G. (Trigonometry)
STUFF WE ALL GET!

List the **2 QUOTIENT** identities	List the **3 RECIPROCAL** identities	List the **PYTHAGOREAN THEOREM** in terms of sine and cosine of θ:
$\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$	$\sin\theta = \frac{1}{\csc\theta}$ $\cos\theta = \frac{1}{\sec\theta}$ $\tan\theta = \frac{1}{\cot\theta}$	$\sin^2\theta + \cos^2\theta = 1$

θ (Degrees)	θ (Radians)	sin θ	cos θ	tan θ $\frac{1}{2}\div\frac{\sqrt{3}}{2}=\frac{1}{\sqrt{3}}$	csc θ	sec θ	cot θ
30	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2}{\sqrt{3}}$ $\frac{2\sqrt{3}}{3}$	$\frac{\sqrt{3}}{\sqrt{3}}$ $\frac{3\sqrt{3}}{3}=\sqrt{3}$
45	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\frac{2}{\sqrt{2}}$ $\frac{2\sqrt{2}}{2}=\sqrt{2}$	$\sqrt{2}$	1
60	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}\div\frac{1}{2}=\sqrt{3}$	$\frac{2}{\sqrt{3}}=\frac{2\sqrt{3}}{3}$	2	$\frac{1}{\sqrt{3}}=\frac{\sqrt{3}}{3}$



θ (Degrees)	θ (Radians)	sin θ	cos θ	tan θ	csc θ	sec θ	cot θ
0	0 $(1,0)$	0	1	0	undef	1	undef
90	$\frac{\pi}{2}$ $(0,1)$	1	0	undef	1	undef	0
180	π $(-1,0)$	0	-1	0	undef	-1	undef
270	$\frac{3\pi}{2}$ $(0,-1)$	-1	0	undef	-1	undef	0
360	2π $(1,0)$	0	1	0	undef	1	undef

Bringing Zesty Back

Name: _____ TP: _____

CW#67-69H - Trig Review
Honors Geometry

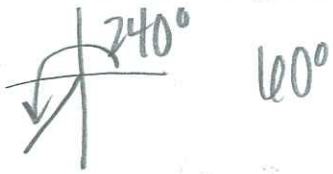
1. For an angle θ that lies in quadrant III, the trigonometric functions ___ and ___ are positive.

S | A
T | C

tangent & cotangent

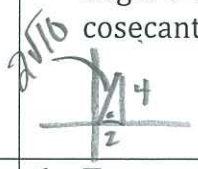
2. Two angles in standard position that have the same terminal side are:_____.

3. The reference angle of 240° is ____.



60°

4. Let (2,4) be a point on the terminal side of an angle θ in **standard position**. Evaluate cosecant, secant, and cotangent of θ



$\csc\theta = \frac{2\sqrt{10}}{4} = \frac{4\sqrt{10}}{2}$ $\sec\theta = \sqrt{10}$ $\cot = 1/2$

5. **True or false**: $\tan\frac{\pi}{2}$ is not defined. (Write your thought process)

(0, 1)
↓ ↓
cos sin

$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{1}{0} = \text{undef}$

6. **True or False:** The reference angle is always an acute angle. (Write your thought process)

true - we always take the reference angle to be positive acute

7. What is the reference angle of 600°?

360+240 RA=60

8. In which quadrants is the **cosine** function positive?

S A ✓
T C ✓

Q1, Q4

9. If $0 \leq \theta < 2\pi$, for what angles θ, if any, is tan θ undefined?

$\frac{\pi}{2}$ & $\frac{3\pi}{2}$

10. What is the reference angle of $\frac{13\pi}{3}$

780
−360
−360 / 60°

RA = 60°

Find the reference angle of each angle. **GRAPH THE ANGLES IN THE COORDINATE PLANE.**

11. -30°

30°

12. 120°

60°

13. 300°

60°

14. $\frac{8\pi}{4}$

45°

15. $\frac{8\pi}{3}$

480
120

60°

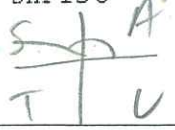
16. -135°

45°

Bringing Zesty Back

Find the **exact** value of each trigonometric function WITHOUT a calculator!

9. $\sin 150°$



$\sin 30$ $\frac{1}{\sqrt{3}/2}$ $1/2$ $+1/2$

10. $\sin 510°$

$1/2$

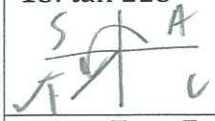
11. $\sin 40° + \sin 130° + \sin 220° + \sin 310°$

X

12. $\tan 40° + \tan 140°$

X

13. $\tan 225°$



RA=45 $\tan 45 = \frac{\sin 45}{\cos 45}$ $\frac{\sqrt{2}/2}{\sqrt{2}/2} = +1$

14. $(\frac{\sqrt{3}}{2}, \frac{1}{2})$ $30°$ or $\frac{\pi}{6}$

15. $(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$

$-45°$ or $315°$

16. The following point corresponds to a point on the unit circle. Find the six trig functions.

$(\frac{\sqrt{5}}{3}, \frac{2}{3})$ ↓ cos ↓ sin

$\sin\theta = 2/3$ $\csc\theta = 3/2$

$\cos\theta = \sqrt{5}/3$ $\sec\theta = 3/\sqrt{5} = \frac{3\sqrt{5}}{5}$

$\tan\theta = 2/\sqrt{5} = \frac{2\sqrt{5}}{5}$ $\cot\theta = \sqrt{5}/2$

Practice Problems: Mixed Review

1) Find the exact value of each expression. Do **not** use a calculator.

a. $4(\cos 45^0) - 2(\sin 45^0)$

$4(\frac{\sqrt{2}}{2}) - 2(\frac{\sqrt{2}}{2})$

$2\sqrt{2} - \sqrt{2} = \sqrt{2}$

b. $2(\sin 45^0) + 4(\cos 30^0)$

$2(\frac{\sqrt{2}}{2}) + 4(\frac{\sqrt{3}}{2})$

$\sqrt{2} + 2\sqrt{3}$

c. $6(\tan 45^0) - 8(\cos 60^0)$

$6(1) - 8(1/2)$

$6 - 4 = 2$

d. $4 + \tan^2 \frac{\pi}{3}$

$4 + (\frac{\sin 60}{\cos 60})^2$

$4 + (\frac{\sqrt{3}}{2}$ $\frac{1}{2}$ $\frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

$4 + (\sqrt{3})^2$

$4 + 3 = 7$

2) Find the exact value of each expression. Do **not** use a calculator.

$\frac{1}{\cos\theta} = \frac{\sqrt{2}}{2} = \frac{\sin\theta}{\cos\theta}$ $\frac{\pi}{3} = 60°$

a. $\sec\frac{\pi}{4} + 2\csc\frac{\pi}{3}$ $\frac{1}{\sin 60}$ $\frac{1}{\sqrt{3}/2}$

$\frac{2}{\sqrt{2}} + 2(\frac{2}{\sqrt{3}}) = \frac{\sqrt{2} + 4\sqrt{3}}{2}$

b. $\tan\frac{\pi}{4} + \cot\frac{\pi}{4}$

$1 + 1 = 2$

$\pi/6 = 30°$ $\frac{1}{\cos 30} = \frac{1}{\sqrt{3}/2} = \frac{2}{\sqrt{3}}$

c. $\sec^2\frac{\pi}{6} - 4$

$(\frac{2}{\sqrt{3}})^2 - 4$

$\frac{4}{3} - \frac{12}{3}$ $-\frac{8}{3}$

d. $1 + \tan^2 30^0 - \sec^2 45^0$

$1 + (\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}})^2 - (\frac{2}{\sqrt{2}})^2$

$\frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}}$

$1 + \frac{1}{3} - \frac{4}{2}$ $-1 + \frac{\sqrt{3}}{3}$

Bringing Zesty Back

3) Find the reference angle for θ, **and** list the **positive** trig functions for θ based on its graph.

a. $\theta = 210°$

RA = 30°
tan/cot

b. $\theta = 420°$

420 − 360 = 60

RA = 60
all trig functions

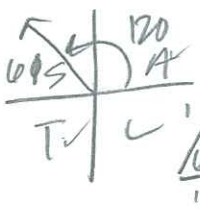
c. $\theta = \frac{15\pi}{4}$

$\frac{\pi}{4}$ or 45°
cos/sec

675 − 360 = 315

4) Use reference angles to find the **exact** value of the following trig functions: **WATCH YOUR SIGNS!**

a. $\tan\frac{8\pi}{3}$



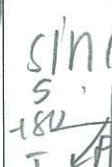
480°
120°

RA = 60°

$\frac{\sqrt{3}}{2} \div \frac{1}{2} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = -\sqrt{3}$

b. $\sin\left(-\frac{2\pi}{3}\right)$

sin(−120)



RA

$\sin 60 = -\frac{\sqrt{3}}{2}$

RA ≠ anything

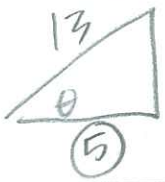
c. $\cos(-2\pi)$

(1, 0)

$\cos -2\pi = 1$

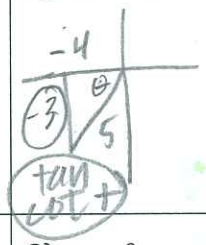
Find the exact value of each of the remaining trigonometric functions of θ. **WATCH YOUR SIGNS!!**

5) $\sin\theta = \frac{12}{13}$, θ in quadrant II



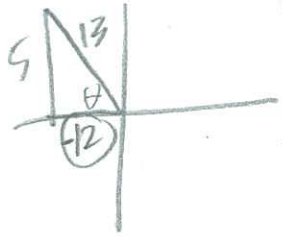
$\sin\theta = 12/13$ $\csc\theta = 13/12$
$\cos\theta = -5/13$ $\sec\theta = 13/-5$
$\tan\theta = \frac{12}{-5}$ $\cot\theta = -5/12$

6) $\cos\theta = -\frac{4}{5}$, θ in quadrant III



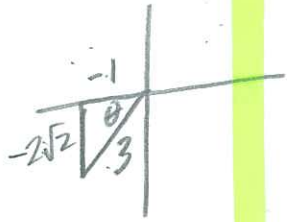
$\sin\theta = -3/5$ $\csc\theta = 5/-3$
$\cos\theta = -4/5$ $\sec\theta = 5/-4$
$\tan\theta = \frac{-3}{-4} = \frac{3}{4}$ $\cot\theta = \frac{-4}{3}$

7) $\sin\theta = \frac{5}{13}$, $90° < \theta < 180°$



$\sin\theta = 5/13$ $\csc\theta = \frac{13}{5}$
$\cos\theta = -12/13$ $\sec\theta = \frac{13}{-12}$
$\tan\theta = \frac{-5}{12}$ $\cot\theta = \frac{-12}{5}$

8) $\cos\theta = -\frac{1}{3}$, $180° < \theta < 270°$



$\sin\theta = \frac{-2\sqrt{2}}{3}$
$\cos\theta = \frac{-1}{3}$
$\tan\theta = +2\sqrt{2}$
$\csc\theta = \frac{3}{-2\sqrt{2}} \cdot \frac{-2\sqrt{2}}{4}$
$\sec\theta = -3$
$\cot\theta = \frac{+1}{2\sqrt{2}} = +\frac{\sqrt{2}}{4}$

Bringing Zesty Back